

Modular Extendable Terrestrial Array, Phase I

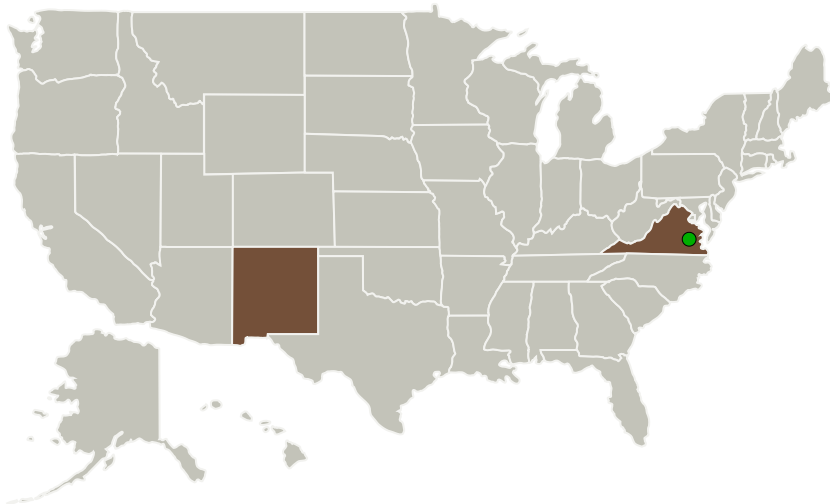
Completed Technology Project (2017 - 2017)



Project Introduction

For Mars mission program managers, who need a robust, structurally efficient solar array system to autonomously deploy on the Martian surface, the Modular Extendable Terrestrial Array (META) is an extremely high performance and cost-effective deployable solar array system that will enable manned missions. LoadPath's approach adapts a demonstrated, high packaging-efficiency array folding architecture for a Martian surface application delivering robust autonomous deployments over uneven terrain, retractability, modularity, portability, minimal CONOPS, and integrated dust mitigation. LoadPath recently invented and demonstrated the feasibility of an advanced, lightweight solar array system to deliver high power generation capability for small satellite systems with extreme stowed volume constraints. Establishing a functional solar array farm on the Martian surface to support manned missions shares many of the technical challenges and requirements of the small spacecraft, large deployable array problem. LoadPath leveraged the findings of this previous effort with its extensive experience in devising and delivering numerous innovative deployable structural systems in the development of the leading concept for an META autonomous deploying terrestrial array. In this Phase I effort, the conceptual design will be developed through a thorough engineering trade study of the required support components, culminating with a functional deployment demonstration with a fabricated prototype structure.

Primary U.S. Work Locations and Key Partners



META Modular Extendable Terrestrial Array

- Extremely Lightweight
- High Packaging Efficiency
- Autonomous Deployment and Retractions
- Modular and Scalable
- Integrated Dust Mitigation
- Flexible CONOPS

Enables High Power Generation for Mars Manned Missions

Stowed Array Module

4kW Deployed Array Module

2500 m² Solar Collection Area Array Farm

Modular Extendable Terrestrial Array, Phase I Briefing Chart Image

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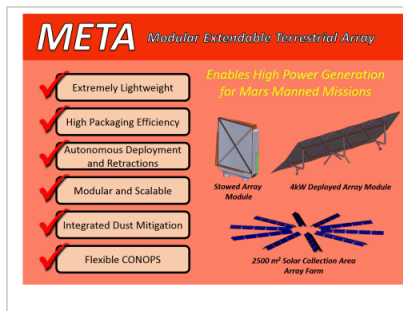
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Organizations Performing Work	Role	Type	Location
LoadPath	Lead Organization	Industry	Albuquerque, New Mexico
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations

New Mexico	Virginia
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Images



Briefing Chart Image

Modular Extendable Terrestrial Array, Phase I Briefing Chart Image (<https://techport.nasa.gov/image/131391>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

LoadPath

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

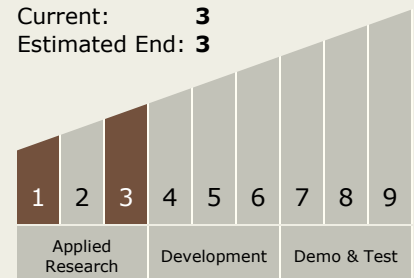
Carlos Torrez

Principal Investigator:

Sungeun K Jeon

Technology Maturity (TRL)

Start: 1
Current: 3
Estimated End: 3



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
 - └ TX12.2 Structures
 - └ TX12.2.1 Lightweight Concepts

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System